

December 2, 2009



Mr. Frank Risi
Sustainment Manager - Transmission Stations Planning
Hydro One Networks
483 Bay Street
Toronto, Ontario
M5G 2P5

Dear Mr. Risi:

***2010 Circuit Breaker Replacements
Notification of Conditional Approval of Connection Proposal
CAA ID Number: 2009-EX453***

Thank you for the information regarding the proposed circuit breaker replacements.

We have concluded that the proposed changes will not result in a material adverse impact on the reliability of the integrated power system.

The IESO is therefore pleased to grant **conditional approval** for the modifications detailed in the attached assessment report. Any material changes to your proposal may require re-assessment by the IESO in accordance with Market Manual 2.10, and may nullify your conditional approval.

Final approval to connect the facilities to the IESO-controlled grid will be granted upon successful completion of the IESO Market Entry process including, without limitation, satisfactory completion of the requirements set out in the System Impact Assessment report. During this process you will be expected to demonstrate that you have fulfilled the requirements and that the facilities you have installed are materially unchanged from the proposal assessed by the IESO. Please refer to the '**External Guidelines for Connection to the IESO**' attachment in your approval email for key steps in the Market Entry process. In order to initiate this process, please contact Market Entry at market.entry@ieso.ca at least eight months prior to your energization dates.

For further information, please contact the undersigned.

Yours truly,

Barbara Constantinescu
Manager – Market Facilitation
Telephone: (905) 855-6406
Fax: (905) 855-6372
E-mail: barbara.constantinescu@ieso.ca
cc: IESO Records

All information submitted in this process will be used by the IESO solely in support of its obligations under the *Electricity Act, 1998*, the *Ontario Energy Board Act, 1998*, the *Market Rules* and associated policies, standards and procedures and in accordance with its licence. All information submitted will be assigned the appropriate confidentiality level upon receipt.

Expedited System Impact Assessment – revised August 9, 2011
Hydro One Networks

1.0 GENERAL DESCRIPTION & PROPOSED MODIFICATIONS

Hydro One proposes to replace a number of breakers that have reached the end of their useful life. Appendix 1 contains a table showing the location and operating designations of the breakers, as well as the ratings of the original and the replacement breakers.

The replacements will take place during 2010 and the outages will be communicated to the IESO via the normal outage management process.

The replacement breakers will operate and remain in their original configuration and location.

2.0 TECHNICAL SPECIFICATIONS

Details of the existing and new breakers are shown at the end of this report in Appendix 1. Any details that are currently not available will be provided prior to receiving final approval to connect from the IESO.

3.0 REQUIREMENTS

The proponent must notify the IESO as soon as it becomes aware of any changes to the assumptions made in the connection assessment. The IESO will determine whether these changes require a re-assessment.

Maximum Voltage

Appendix 4.1, reference 2 of the Market Rules states that under normal conditions the 115, 230 and 500 kV systems in Ontario are maintained within the voltage ranges shown below in Table 1. Thus, the IESO requires that high voltage equipment in Ontario must have maximum continuous voltage ratings as listed below in table 1.

Fault interrupting devices must be able to interrupt fault current at the maximum continuous voltages.

Permissible Voltage Ranges in Ontario (Appendix 4.1, reference 2 of the Market Rules)		
	Voltage range	Maximum continuous voltage
115 kV system – southern Ontario	113 - 127 kV	127 kV
115 kV system – northern Ontario	113 - 132 kV	132 kV
230 kV system	220 - 250 kV	250 kV
500 kV system	490 - 550 kV	550 kV

Table 1 – Permissible Voltage Ranges in Ontario

Fault Levels

The Transmission System Code (TSC), Appendix 2 establishes maximum fault levels for the transmission system. The maximum 3 phase symmetrical fault levels and the single line to ground (SLG) symmetrical fault levels are listed in the table below.

The TSC requires that new equipment be designed to sustain the fault levels in the area where the equipment is installed. If any future system enhancement results in an increased fault level higher than the equipment’s capability, the connection applicant is required to replace the equipment at their own expense with higher rated equipment capable of sustaining the increased fault level, up to the TSC’s maximum fault levels as listed in the table below.

Maximum Permissible Fault levels in Ontario (Appendix 2 of the Transmission System Code)		
	maximum 3 phase symmetrical fault level	single line to ground (SLG) symmetrical fault level
115 kV system	50 kA	50 kA
230 kV system	63 kA	80 kA (usually limited to 63 kA)
500 kV system	80 kA	80 kA (usually limited to 63 kA)

Table 2 – Permissible Fault levels in Ontario

IESO Monitoring Requirements

In accordance with the telemetry requirements for transmitters (see Appendices 4.16, 4.20 and 4.21 of the Market Rules) the connection applicant must install equipment with specific performance standards to provide telemetry data to the IESO. The data is to consist of certain equipment status and operating quantities which will be identified during the IESO Market Entry Process.

As part of the IESO Facility Registration/Market Entry process, the connection applicant must also complete end to end testing of all necessary telemetry points with the IESO to ensure that standards are met and that sign conventions are understood. All found anomalies must be corrected before IESO final approval to connect any phase of the project is granted.

Protection Requirements

New protection systems must be coordinated with existing protection systems and must be designed to satisfy the requirements of the Transmission System Code (TSC). Facilities designated as essential to power system reliability must be protected by two redundant protection systems according to section 8.2.1a of the TSC. These redundant protections systems must satisfy all requirements of the TSC but in particular they may not use common components, common battery banks or common secondary CT or PT windings.

Please send documentation for protection changes triggered by new or modified primary equipment (i.e. new or replacement relays) to connection.assessments@ieso.ca. For protection changes that are not associated with new or modified equipment (i.e. protection setting changes) please send documentation to protection.settings@ieso.ca.

Provided that the TSC requirements are satisfied, the IESO does not have additional requirements.

Facility Registration/Market Entry Requirements

The connection applicant must complete the IESO Facility Registration/Market Entry process in a timely manner before IESO final approval for connection is granted. Models and data, including any controls that would be operational, must be provided to the IESO. This information should be submitted at least seven months before energization to the IESO-controlled grid, to allow the IESO to incorporate this project into IESO work systems and to perform any additional reliability studies.

As part of the IESO Facility Registration/Market Entry process, the connection applicant must provide evidence to the IESO confirming that the equipment installed meets the Market Rules requirements and matches or exceeds the performance predicted in this assessment. This evidence shall be either type tests done in a controlled environment or commissioning tests done on-site. In either case, the testing must be done not only in accordance with widely recognized standards, but also to the satisfaction of the IESO. Until this evidence is provided and found acceptable to the IESO, the Facility Registration/Market Entry process will not be considered complete and the connection applicant must accept any restrictions the IESO may impose upon this project's participation in the IESO administered market or connection to the IESO-controlled grid.

The evidence must be supplied to the IESO within 30 days after completion of commissioning tests. Failure to provide evidence may result in disconnection from the IESO-controlled grid.

If the submitted models and data differ materially from the ones used in this assessment, then further analysis of the project will need to be done by the IESO.

4.0 ASSESSMENT & CONCLUSIONS

This expedited System Impact Assessment concludes that the breaker replacements are not expected to have a material adverse impact on the IESO-controlled grid.

Appendix 1 - Equipment Rating

Location	Identifier	Maximum Continuous Voltage (kV)		Continuous Current Rating (A)		Short Circuit Symmetrical Current Rating (kA)	
		Existing Equipment	Replacement Equipment	Existing Equipment	Replacement Equipment	Existing Equipment	Replacement Equipment
Chatham SS	DL44	230	To be provided before new equipment is permitted to go into service.	2000	To be provided before new equipment is permitted to go into service.	52.5	To be provided via "Secure Web for HydroOne Operational Information"
Chatham SS	L22L44	230		2000		52.5	
Chatham SS	KL22	230		2000		52.5	
Algoma TS	DL24	230		2000			
Algoma TS	KL23	230		2000			
Algoma TS	KL24	230		2000			
Algoma TS	L22L23	230		2000			
Algoma TS	DL22	230		1200			
Chats Falls SS	HL3	230		2000			
Chats Falls SS	AH	230		2000			
Chats Falls SS	DL3	230		2000			
Lakehead TS	KL1	115		1200			
Rabbit Lake SS	L3L4	138		800			
Rabbit Lake SS	L2L7	138		800			
St.Isidore TS	A1A2	230		2000			
South March TS	A1A2	230	2000				

All information submitted in this process will be used by the IESO solely in support of its obligations under the *Electricity Act, 1998*, the *Ontario Energy Board Act, 1998*, the *Market Rules* and associated policies, standards and procedures and in accordance with its licence. All information submitted will be assigned the appropriate confidentiality level upon receipt.